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ABSTRACT

A study was conducted to determine the net impact of Job Training Partnership Act (JTPA) training. (A measure of net impact expresses only those gains due to training and not those due to other reasons.) Job Service applicants were chosen as a comparison group whose recent labor market experiences would parallel those of JTPA participants. All results were positive. For men who participated in JTPA in 1983-84, the estimated effect of training was an additional $1,400 earned during 1985. It appeared likely that the benefit persisted in 1986. For white women, the estimated effect of training was an additional $1,000 earned in 1985. A separate estimate of the impact on earnings was made for recipients of Aid to Families with Dependent Children (AFDC). For them, the effect was an additional $1,200 in 1985 earnings. Because their initial earnings were so low, this amounted to approximately 100 percent of 1979 income. The reduction in AFDC grant amounts attributable to training was another measure of impact used. Twelve months after enrollment, AFDC recipients who participated in training were 86 percent more likely not to be receiving assistance than were their counterparts who did not participate. (YLB)

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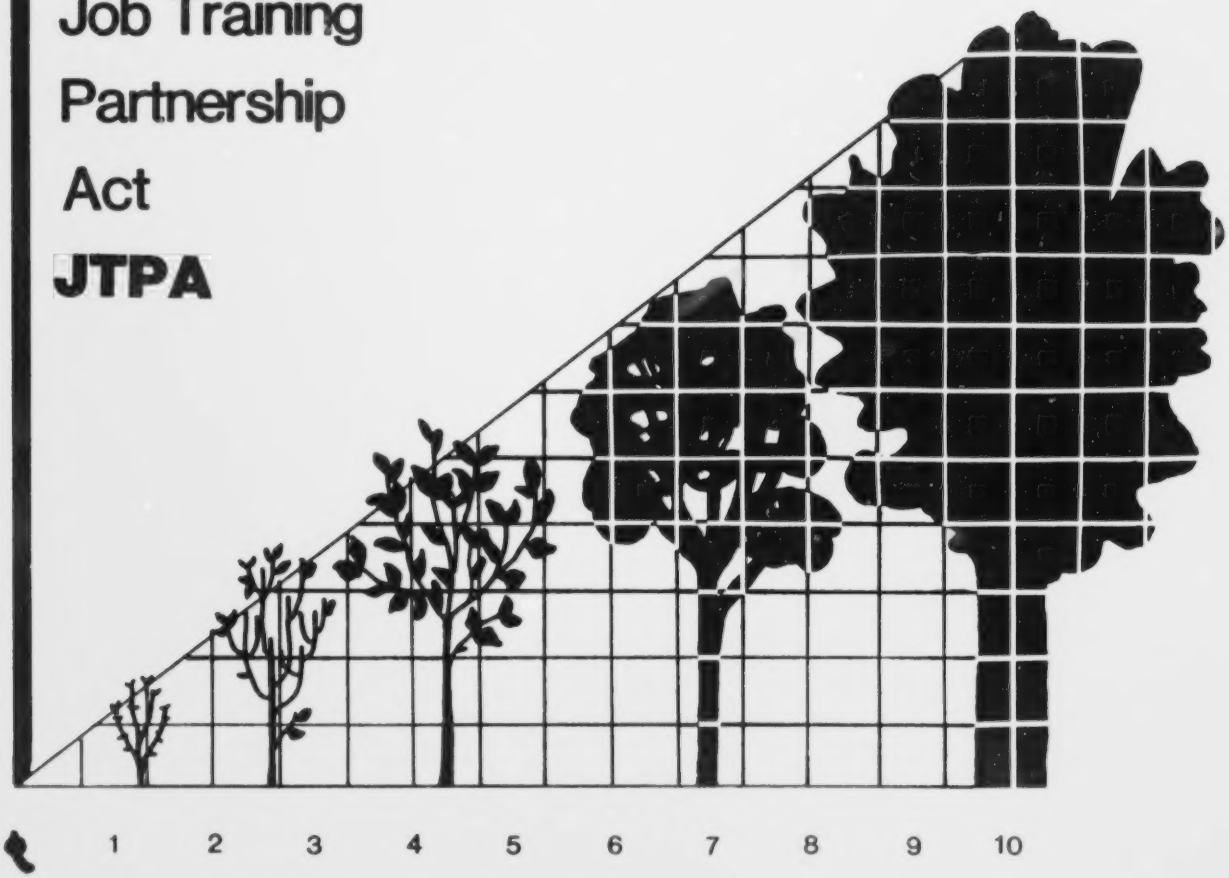
THE RETURN ON INVESTMENT

from Indiana's training programs funded through the Job Training Partnership Act

JTPA



Indiana Office of Occupational Development

JOHN M. MUTZ
Lt. Governor

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THE RETURN ON INVESTMENT FROM INDIANA'S TRAINING PROGRAMS FUNDED THROUGH THE JOB TRAINING PARTNERSHIP ACT

October 31, 1986

Indiana Office of Occupational Development

Thomas A. Krudy, Executive Director

John M. Mutz, Lt. Governor

This study was conducted under the auspices of the Research and Assessment Section of the Indiana Office of Occupational Development. David Reed was the principal investigator. A condensed version of the report is available. For a copy, contact Patrik I. Madaras, Director, Research and Assessment at IOOD, 150 W. Market Street, 7th Floor, Indianapolis, IN 46204.

EXECUTIVE SUMMARY

With the advent of the Job Training Partnership Act (JTPA), the issue of the effectiveness of job training has become critical. Under JTPA, job training is explicitly recognized as an investment, and training efforts must be productive.

Recognizing the importance of identifying the return on investment from Indiana's job training efforts, the Indiana Office of Occupational Development (IOOD) conducted a study of the net impact of training. Performance standards, such as the entered employment rate, measure gross impact alone. That is, they do not take into account that some persons would obtain employment without training. A measure of net impact expresses only those gains due to training and not those due to other reasons.

This study employed research procedures that are standard for academic research in this area. Unfortunately, none of the research procedures used to date have proven to be wholly satisfactory. Because of this, the Job Training Longitudinal Survey Research Advisory Panel has recommended that a classical experiment be conducted to resolve uncertainties about the true effects of JTPA training on employment and earnings. Until the results of such a classical experiment are available, the conclusions of this study and of all other studies of its kind must be considered provisional.

Given that caution, it can be reported that all results are positive. For men who participated in JTPA in 1983-84, the estimated effect of training is an additional $1400 earned during 1985--all amounts are given in constant (1983) dollars. While 1986 income data was not available, it appears likely that the benefit persisted in 1986. For white women, the estimated effect of training is an additional $1000 dollars earned in 1985. (For technical reasons it was not possible to make an estimate for black women.)

A separate estimate of the impact on earnings was made for Aid to Families with Dependent Children (AFDC) recipients. For them, the effect was an additional $1200 in 1985 earnings. Because their initial earnings were so low, this amounted to approximately 100% of 1979 income.

Other measures of impact can be used for AFDC recipients. One is the reduction in AFDC grant amounts attributable to training. The average reduction twelve months after enrollment is estimated to be $105 per month. A calculation was also made of the effect of training on the probability of terminating from AFDC assistance. Twelve months after enrollment, AFDC recipients who participated in training were 86% more likely to no longer be receiving assistance than were their counterparts.

INTRODUCTION

The Job Training Partnership Act (JTPA) declares that job training is an "investment in human capital and not an expense" (PL 97-300, S. 106 (a)). Accordingly, the Act prescribes that the return on investment be measured by increases in employment and earnings. This emphasis in JTPA set a new course for federally-funded job training and furthered interest in obtaining valid information about the earnings impact of job training. In response, the Research and Assessment section of the Indiana Office of Occupational Development (IOOD) has undertaken a study of the effect of training on the earnings of JTPA participants from across the state of Indiana.

A second innovation of JTPA makes it especially appropriate that a study of this kind be conducted at the state level. Under JTPA, the individual states hold the basic responsibility for the oversight of job training efforts, so it is reasonable that the individual states also should take the responsibility for determining the effectiveness of job training within their jurisdictions. It is such reasoning that prompted the National Commission on Employment Policy (NCEP) to issue guidelines for states to use to conduct their own evaluations of JTPA. The state of Indiana, however, has been in the forefront in commitment to state level evaluations, recognizing the need and initiating this study several months ahead of the issuance of the NCEP guidelines. The experience that IOOD has gained may be of use to other states and to service delivery areas planning a similar study.

OBJECTIVE

The study is intended to determine the net impact of JTPA training. The Department of Labor has established performance standards specifically intended to measure the impact of training on employment and earnings. These are the entered employment rate and the average wage at placement. These performance standards, however, are measures of gross impact. That is, they indicate post-program outcomes, but do not let us know whether such outcomes might have been achieved without the intervention of job training. It is conceivable that, due to any number of other causes, the same number of people would have obtained employment, at the same average wage rate, even without the intervention of job training. A measure of net impact identifies the difference between actual post-program outcome and the outcome that would have occurred without training. That is, it measures only that part of change in earnings and employment that results from the training.

Obviously, the clock cannot be turned back for participants to see what would have happened to them if they had not received training. Some kind of comparison group is needed to represent the participants as they would have been if they had not gone through job training. The best comparison group would be one composed of eligible JTPA applicants who were assigned randomly to a non-training group. Their subsequent earnings could then be compared to applicants who had been randomly assigned to receive training. This is the classical experimental design and it ensures that there are no systematic differences between the "treatment" group and the comparison group.

For various reasons, this kind of classical experiment has never been carried out to determine the effects of job training, although such an ex-

periment soon will be conducted at the national level under the recommendation of the Job Training Longitudinal Survey Research Advisory Panel. In any event, it is unlikely that it will ever be practical for a state to conduct a classical experiment of this kind. Given this limitation, some other kind of comparison group must be selected. This group should be as similar as possible to the training group.

The national studies of the Comprehensive Employment and Training Act (CETA) that have been done were all based upon a single sample taken from the Current Population Survey. This comparison group has been found to be less than ideal. The comparison group used in this study is composed of Job Service applicants. Although the decision to use this particular comparison group was made before the issuance of the NCEP guidelines, this is the same choice proposed by those guidelines. It is more than coincidence that the decision to use Job Service applicants as a comparison group should be reached independently by different people.

There are very good reasons for thinking that this group would be a good choice for comparison. One is that Job Service applicants would appear to have qualities similar to that of JTPA participants, to have similar employment experiences, and to have similar opportunities for future employment. By selecting those who applied for placement services during the same period that the JTPA group studied was enrolling in JTPA, a researcher would seem likely to obtain a comparison group whose recent labor market experiences would parallel those of JTPA participants. Specifically, it could be hoped that Job Service applicants would have experienced the same pre-application dip in earnings that has been found characteristic of those who seek job training.

Job Service applicants are desirable also because data for them is relatively accessible at the state level. Furthermore, if there were not already a close state-level relationship between Employment Security (ES) and JTPA administrative units, as there is in Indiana and many other states, it would be desirable in any event to establish a relationship in order to obtain income data for those included in the study. Using Job Service applicants simply makes the whole process of data acquisition more efficient.

Then, too, information about personal characteristics is available for Job Service applicants, as it is for JTPA applicants, since this data is collected for both at the time of application. Such information is useful for judging the similarity of the two groups and for controlling for differences between them. Unfortunately, there is information available for both groups on only a few characteristics (age, race, gender, disability status, veteran status, and welfare status). Other possibly relevant characteristics, such as offender status and number of dependents, are known only for one group or the other.

The time period established for selecting both comparison and participant groups corresponds to the first six months of JTPA, October 1, 1983 to March 31, 1984. Since this was a transition period, the experience of participants from that time period may not be typical of that of later participants. However, it was thought advisable to select as early a time period as possible in order to have available the longest possible period of post-program earnings to examine.

Eligibility for inclusion in the sample for the study was determined by the date of <u>enrollment</u>. This practice, too, conforms to NCEP guidelines and, again, the same logic directed our decision as directed theirs: the concept of termination date has no meaning for the comparison group and thus one could not use a termination date as the criterion for synchronizing the labor market experiences of the two groups.

The table below compares the distribution of characteristics for both groups.

	COMPARISON GROUP		JTPA PARTICIPANTS	
MEN	441	48.8%	374	51.4%
WOMEN	462	51.2%	353	48.6%
WHITE	636	70.7%	398	54.7%
BLACK	231	25.7%	285	39.2%
HISPANIC	25	2.8%	35	4.8%
ASIAN OR PACIFIC	8	.9%	9	1.2%
VETERAN	151	16.7%	124	17.1%
RECEIVING WELFARE	124	13.7%	135	18.6%
HANDICAPPED	30	3.3%	19	2.6%
SCHOOL DROPOUT	239	26.5%	174	23.9%
HIGH SCHOOL GRAD	469	51.9%	401	55.2%
POST HIGH SCHOOL	195	21.6%	152	20.9%
AGE	34.3 years		31.5 years	

The JTPA group is a little younger, has a higher proportion of minorities, has a higher proportion of welfare recipients, and has a somewhat lower proportion of high school dropouts. The difference in the proportion of high school dropouts is too slight to suggest that the more desirable applicants are being selected for JTPA. The difference in the proportion of welfare recipients appears despite the fact that additional welfare recipients were (randomly) selected for inclusion in the comparison group. This was done because it was known that, in general, a major difference between ES applicants and JTPA participants was the proportion of welfare recipients among them. As it turned out, the procedure still did not suffice to provide similar proportions in both groups.

Characteristics are displayed below for separate race and gender combinations. This has been done because many studies have indicated that job training effects vary by race and gender combinations, and subsequent analyses will consider whether such differences can be identified in this study.

No breakdowns of characteristics are presented for Hispanics or Asians/ Pacific Islanders, because of the very low numbers of them in the sample.

BLACK WOMEN

	COMPARISON GROUP		JTPA PARTICIPANTS	
RECEIVING WELFARE	68	49.6%	66	44.9%
HANDICAPPED	7	5.1%	0	0.0%
SCHOOL DROPOUT	38	27.7%	39	26.5%
HIGH SCHOOL GRAD	67	48.9%	71	49.0%
POST HIGH SCHOOL	32	23.4%	36	24.5%
AGE	29.9 years		30.0 years	

WHITE WOMEN

	COMPARISON GROUP		JTPA PARTICIPANTS	
RECEIVING WELFARE	38	12.5%	44	23.4%
HANDICAPPED	8	2.6%	9	4.8%
SCHOOL DROPOUT	73	24.1%	43	22.9%
HIGH SCHOOL GRAD	168	55.5%	122	64.9%
POST HIGH SCHOOL	62	20.4%	23	12.2%
AGE	34.9 years		32.4 years	

BLACK MEN

	COMPARISON GROUP		JTPA PARTICIPANTS	
VETERAN	27	28.7%	45	32.6%
HANDICAPPED	2	2.1%	0	0.0%
SCHOOL DROPOUT	35	37.2%	38	27.5%
HIGH SCHOOL GRAD	37	39.4%	67	48.6%
POST HIGH SCHOOL	22	23.4%	33	23.9%
AGE	32.6 years		31.6 years	

WHITE MEN

	COMPARISON GROUP		JTPA PARTICIPANTS	
VETERAN	117	35.1%	67	31.9%
HANDICAPPED	12	3.6%	9	4.3%
SCHOOL DROPOUT	76	22.8%	41	19.5%
HIGH SCHOOL GRAD	186	55.9%	116	55.3%
POST HIGH SCHOOL	71	21.3%	53	25.2%
AGE	35.9 years		32.1 years	

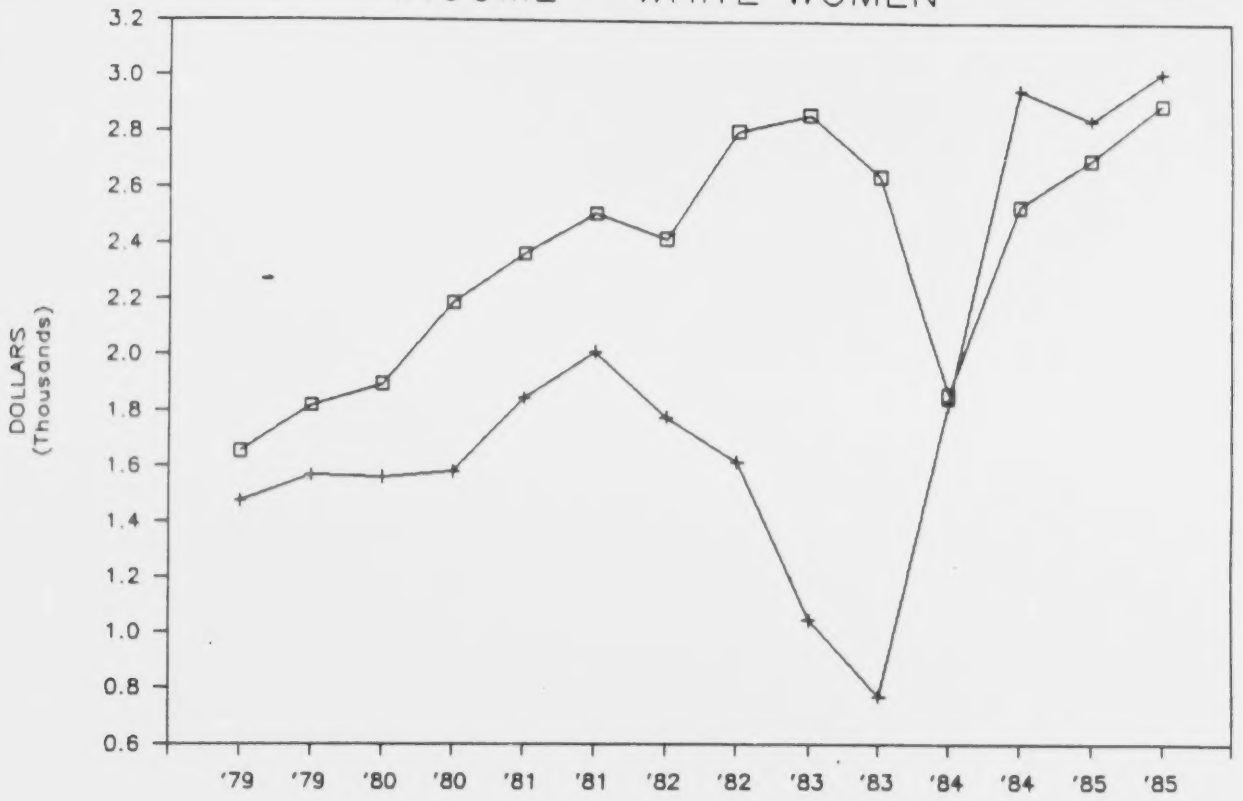
JTPA participants are younger in all categories except that of black women. For black men the proportion of dropouts is much lower in the JTPA group than in the comparison group. Among the white women in the sample, the comparison group has a substantially higher proportion of persons with more than a high school education. The proportion of handicapped varies rather erratically from category to category and from comparison group to JTPA group, but analyses of the relationship between characteristics and income found no relationship between handicapped status and income, so this variation is probably not of consequence. The lack of relationship may be due to inconsistencies in classification that are known to have existed for handicapped status.

Greater similarity within categories for the JTPA and comparison groups could have been achieved by use of a matching routine to select the comparison group. Matching was not done, however, in part because of the complexity this would have added to the selection process, but primarily because such a procedure still would not guarantee a match in earnings behavior (see below), which is what is really wanted.

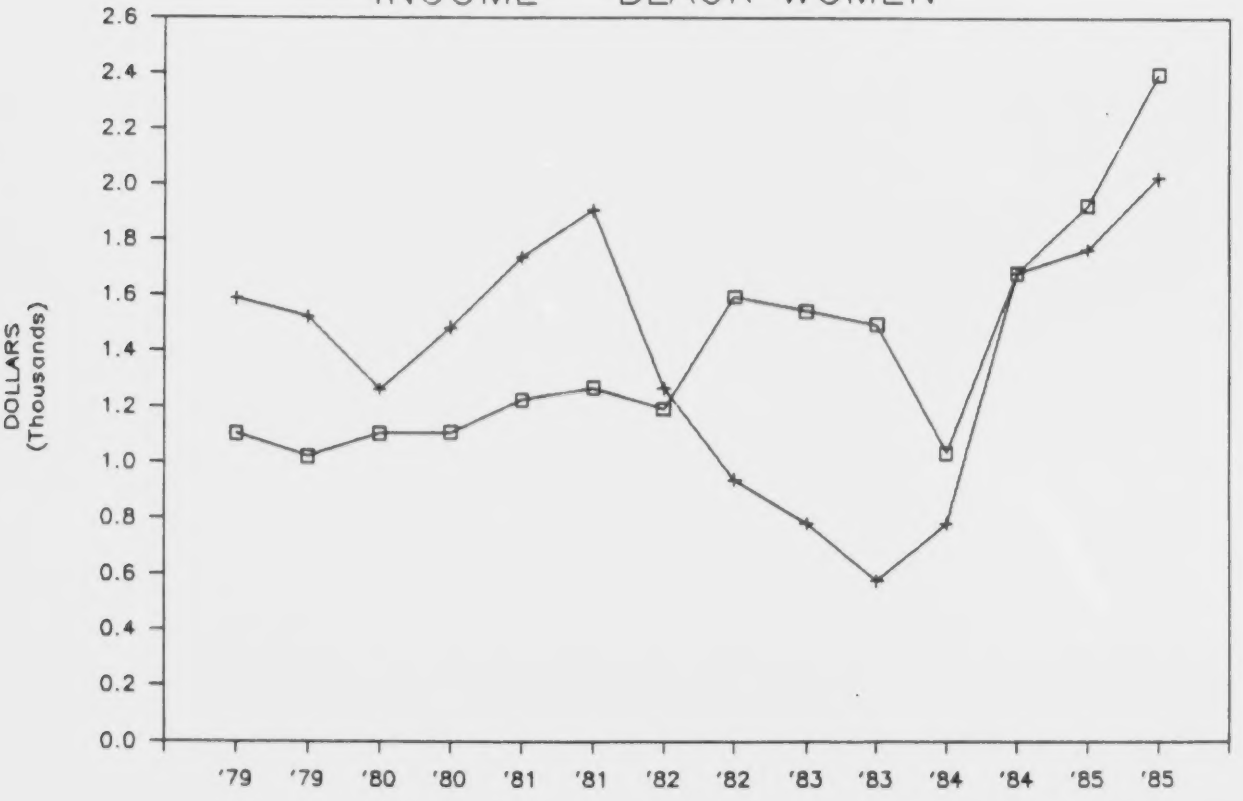
Income is the main variable of interest. Tables beginning on the following page present income trends from 1979 to 1985 for JTPA and comparison groups within race-gender categories.

There is a general pattern that appears over all four categories for both the JTPA group and the ES comparison group. This is the decline in overall earnings prior to the enrollment period. Such a decline was expected. For JTPA particpants the period of decline is somewhat longer than anticipated. The literature suggests that such a dip will occur in the year immediately preceding enrollment, but for all JTPA participants the decline begins at least two years prior to the enrollment period and for black men a

INCOME--WHITE WOMEN

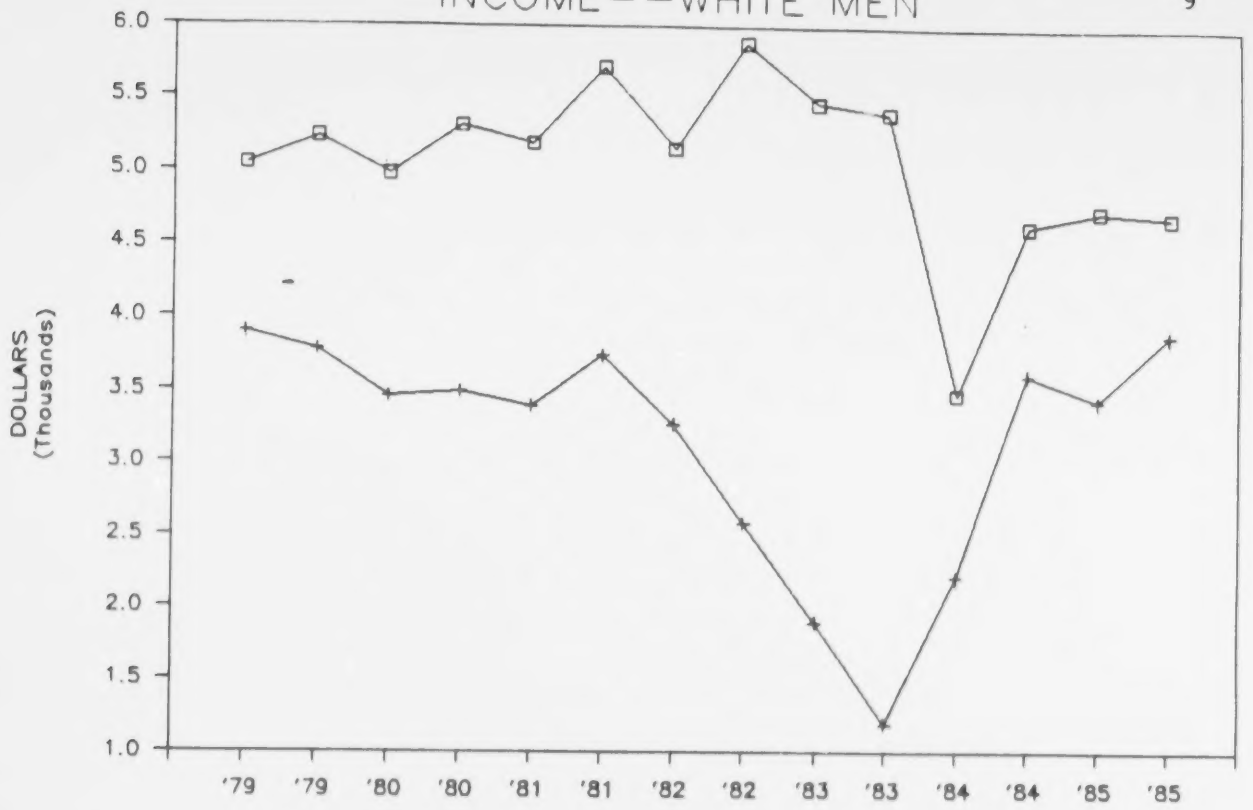


INCOME--BLACK WOMEN

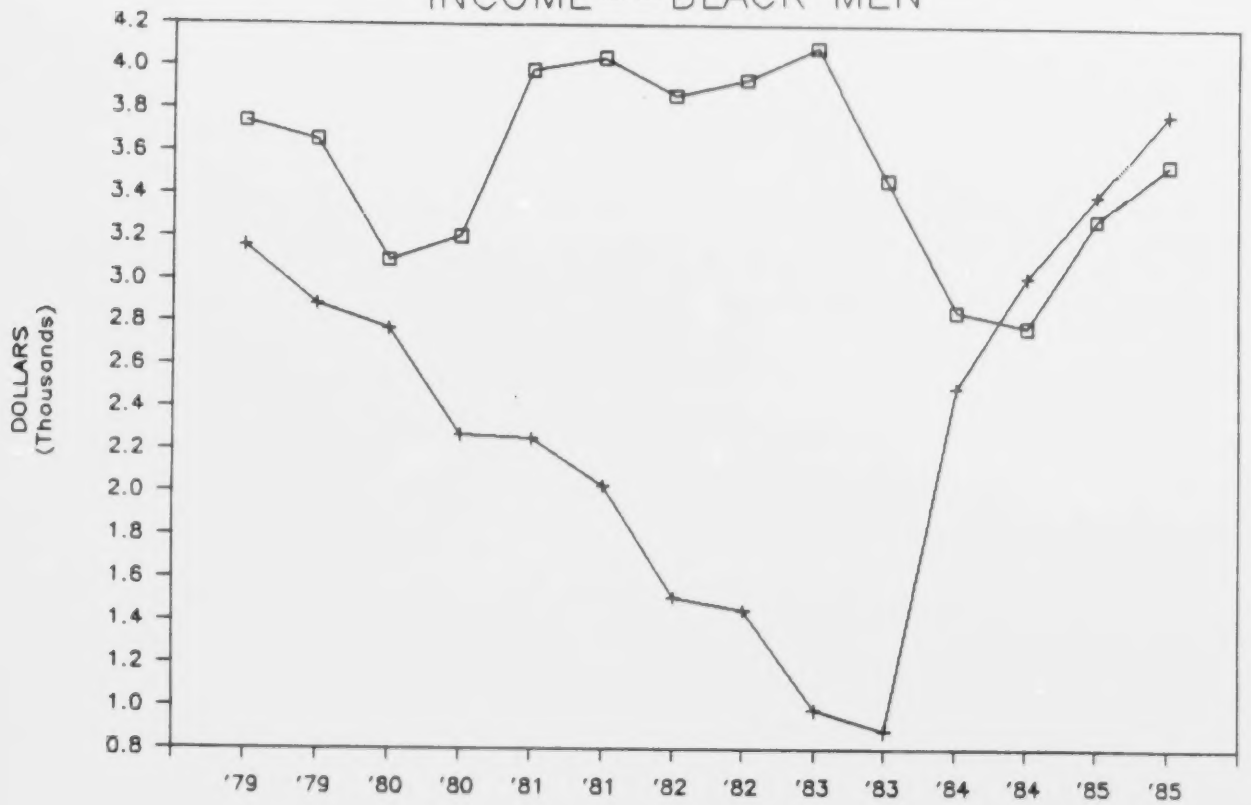


□ COMPARISON GROUP + JTPA PARTICIPANTS

INCOME--WHITE MEN



INCOME--BLACK MEN



□ COMPARISON GROUP

\+ JTPA PARTICIPANTS

decline is apparent from 1979, the earliest date for which income information is available. (If "real," i.e., inflation adjusted dollars, are used the decline also appears in 1979 for white men.) This raises the question of how transitory the pre-enrollment decline in earnings would be without the intervention of training. The assumption made in the literature (implicitly and explicitly) that this decline is non-permanent and, in fact, quite transitory may not be valid.

Unfortunately, the data for ES applicants does not help to determine what the pattern would be for participants if they did not enter training. For ES applicants, the earnings decline appears no sooner than one year before the enrollment period. For white women and black men the decline does not appear until six months before the enrollment period. Crude measures indicate that the decline lasts approximately one and one-half years for ES applicants and two and one-half years for the JTPA participants. This suggests that the rate of recovery experienced by the ES applicants might not be a good indicator of what would have happened to the JTPA participants without training. It is even conceivable that without training there might not have been any recovery for the JTPA group. The experience of the two groups in the two years immediately preceding enrollment is not similar enough to give one confidence in any definite assumption about the degree of permanence of the decline.

Prior to enrollment, the income level of the JTPA group is lower than that of the comparison group for three of the four race-gender categories. Only for black women is the income level of the JTPA group higher. It should be noted that these income levels are not adjusted for differences in characteristics between the two groups. In order to make estimates of the effect of training, it will be necessary to make such adjustments. The next section will review the different methods that econometricians have developed to estimate the effects of training on income.

METHODOLOGY

Estimates of the impact of training can be distorted if differences between the comparison group and training group exist prior to enrollment and have an effect on income. The ideal methodology would adjust for all such differences. A difficulty for all studies of this kind has been that only a few individual characteristics are known for group members. These are the readily identifiable characteristics. Less easily identified but possibly quite important characteristics, such as motivation and innate ability, are not known.

In response to this lack of knowledge, econometricians have developed methods that are designed to take into account unmeasured, as well as measured, characteristics. This is done by using information about prior income. That is, if two individuals have different income levels prior to training, it is assumed that the difference in income reflect differences in factors that influence income.

Methods designed to use prior income in this way fall into two general categories. There is the autoregressive technique and the fixed effects, or differencing, technique. The autoregressive technique uses prior income, in combination with known characteristics, to predict future income. Estimating the effect of training requires simply adding a variable for training status to an equation predicting post-program income:

$$INC_{POST} = a(CHAR) + b(INC)_{PRE} + c(TRAIN)$$

where INC_{POST} stands for post-program income, CHAR stands for known characteristics, INC_{PRE} stands for pre-program income, and TRAIN stands for train-

ing status (coded 1 for those who received JTPA training and 0 for those who did not). The lower case letters a, b, and c stand for the effect each of the variables has on income.

The fixed effects technique, on the other hand, does not predict income per se, but rather change in income. The most commonly used form of this technique involves taking income during one period and subtracting from it income during an earlier period. This eliminates differences in the absolute level of income and leaves only a measure of how much income changed between the periods. This assumes that all factors which influence income have the same effect at one time that they have at another, thus the designation "fixed effects" to describe the technique. The resulting equation to estimate training effects takes the form:

$$(INC_{POST} - INC_{PRE}) = a(CHAR) + c(TRAIN)$$

where each symbol has the same meaning as described above. It should be noted that most characteristics are eliminated from the right hand side of the equation by being "differenced out." A reasonably straightforward (i.e., non-econometric) explanation of this is that only those factors which have a changing effect on income over time are included as predictors.

The characteristics which are usually included in the equation are age and age squared. The general relationship of age to income is known not to be "fixed." In this study a variable is added for area of residence in order to capture change in the effect on income of area of residence. This is a somewhat unorthodox procedure, but the variable is included because it has a substantial effect on income change. Leaving it out does not change the direction of the estimates, although it does lower them somewhat.

A variation of this technique was used in a Congressional Budget Office evaluation of CETA. In this variation, income data for a series of pre-enrollment periods was used to project an income trend into the post-program period. Then the difference was calculated between the actual post-program income and the projected income for that period. This difference was then correlated with training status and individual characteristics. The apparent advantage of this approach is that it makes use of more pre-program income information than does the conventional version of the fixed-effects technique, which produces an estimate based on only one pre-program period.

No existing statistical techniques for estimating the effect of training on income, in any variation, can be considered to be very satisfactory. This is true even though some extraordinarily complex statistical manipulations have been devised to try to improve estimates. This is also the conclusion of the Job Training Longitudinal Research Advisory Panel. Varying approaches have produced varying estimates of the effect of training even when the same data set has been used. Furthermore, there is no way to tell which estimates are correct, or, in fact, if any of them are correct. In all cases the researcher is forced to make assumptions that are open to question. This is the reason that a classical experiment has been proposed.

Still, in the absence of information from a classical experiment, one must do the best one can--or do nothing at all. So, with cautions noted, the analysis is reported.

TESTING A MODEL

While it cannot be determined conclusively whether estimates obtained are accurate or not, it is at least possible to determine if one has a chance of getting straightforward estimates of the effect of training on earnings. To do so, two tests can be applied to any model used to make estimates. The first test indicates whether the earnings process operates in the same way for both the participant and the comparison groups. This means that individual characteristics and prior income must affect future income in the same way for both participant and comparison groups.

The second test requires determining that the variable for training status is not related to level of income prior to training. Since training obviously cannot have an effect on income before the training occurs, finding such a relationship means that the training status variable is a proxy for pre-existing differences in earning potential between the participant and comparison groups, differences that are not controlled for by the statistical procedure. If such a relationship is found, it means that any estimate of the effect of training on post program earnings will be contaminated by this pre-program difference. The NCEP guidelines suggest that the pre-program value of the training variable can be subtracted from the post-program value of the variable to get the estimate of the effect of training. While unconventional, this procedure at least allows for making a fairly reasonable estimate.

CHOOSING A METHOD

The initial choice for a method was the particular fixed effects method used for the Congressional Budget Office study of CETA (henceforth called the deviation-from-trend method). The deviation-from-trend method may employ several years of income in making a prediction of future income--although it is advisable not to use the year or so immediately before the enrollment period on the assumption that the earnings dip at that time is transitory. Being able to use a number of years of income data would seem to make the estimate more reliable.

The deviation-from-trend method does, however, have the potential to produce exaggerated estimates of the impact of training, because downward income trends are unlikely to persist, as the method assumes. Downward income trends certainly cannot continue indefinitely, since zero earned income is the least anyone can have. Consequently, for those with downward income trends, which many participants proved to have prior to enrollment, projected post-program income will probably be underestimated and thus the effect of training may be (greatly) overestimated.

Because of this problem, the deviation-from-trend method is only used as a secondary method. The NCEP guidelines reject this method altogether because of this problem, but results from using it are presented here to see what the effect is of assuming that an extended pre-program dip in earnings is not transitory.

The autoregressive method has been shown to underadjust for differences between the participant and comparison groups, and for some time it was in disfavor among researchers concerned with estimating the effects of training. Thus, it was not considered for use in this study until the NCEP

guidelines were received. The autoregressive method is suggested as the preferred method by the NCEP guidelines, apparently because the author believes the technique is easiest to explain to non-technical people and the limitations of it are not too important. Another factor to recommend it is that it, too, can make use of several years of pre-program income to estimate the earnings equation.

Results from this technique will not be presented here, though, since it cannot meet the first test specified above. The effect of pre-program income on future income varies between the participant and comparison groups for all pre-program years except the earliest. In other words, the earnings functions of the two groups come to differ (increasingly) as the enrollment period approaches. This divergence suggests that using income data from the period close to enrollment will distort the results.

This leaves the conventional fixed effects method (henceforth called the income change method) as the preferred method. This method relies upon only one year of prior income in making an estimate of training effects on income, which means, in effect, that one must assume income during one particular year is indicative of long term earning potential. As might be expected, estimates made using this method have been shown to be very sensitive to the specific year chosen as the base year. Obviously, a single year is not the best indicator of long term earning potential, especially for people who are likely to be experiencing unusually bad times. However, as noted, no method will produce results in which one can be completely confident and this one seems to be best for the data available.

It is advisable to select a base year with some caution. The base year used was 1979, the earliest year for which income data was available. Use of any of the later pre-program years was precluded because, when those

years are used as the base, change in income is related to the training status variable, even during the pre-program period. Intuitively, too, it would seem that the earliest year would provide the best estimate of normal earnings level. It would be very good to have income information for earlier periods to get a fuller indication of the individual's basic income pattern, but this was not available.

ESTIMATES OF THE EFFECT OF TRAINING ON THE EARNINGS OF PARTICIPANTS

In the analysis, data for men and women were never combined. Data for all men were eventually combined, but only after initial tests were made separately by race. The first test made was whether the earnings function differed between the participant and comparison groups. For black, white, and Hispanic men (the low numbers of Hispanic men make the test somewhat unreliable for them) the earnings functions were found not to be significantly different between participant and comparison groups. For white women, also, the earnings functions did not differ.

For black women, however, the earnings functions did differ between the participant and comparison groups. It was noted earlier, of course, that the pattern of income for participant and comparison groups was different for black women than it was for the other race-gender categories. This is true even though the participant and comparison groups were best matched on (known) characteristics for the black women category. Clearly, similarity of the two groups on a few characteristics is no guarantee of similarity in earnings behavior between the groups.

The next test was whether the training status variable correlated with change in income before the enrollment period. This was done using the general form of the equation to estimate the post-program effect of training, with the substitution of a pre-program income year as the later year:

$$(INC_{80} - INC_{79}) = a + b(AGE) + c(AGE\ SQUARED) + d(TRAINING)$$

where INC_{80} is income in 1980, a pre-program year; INC_{79} is income in 1979, the first pre-program year for which income data was available; a is a con-

stant factor; TRAINING is given the value of 1 for participants and 0 for comparison group members; and b, c, and d are the effects of each of the variables. Thus, d should not be significantly different from zero to meet this test. Age and age squared are included because the effect on income of one year's difference in age varies with the actual age level. In other words, the effect of age is not fixed.

Following the results of these tests, estimates were made of the effect of training on post-program earnings. All results will be presented in constant (1983) dollars. To make an initial estimate, data were pooled for all men without consideration of race. Using 1985 as the post-program year, the effect of training for men is estimated to be approximately $1,600 for that year (p=.05). The year 1985 was used because 1984 appears to be a recovery year; 1984 income would not seem to reflect the final realization of the effects of training. Income from 1985 seems more likely to reflect fundamental income change. In fact, income data from 1986 surely would serve even better to indicate the basic training effect, but this data is not available yet.

Further estimates were made allowing for variations by race in the statistical model. The impact of training itself was not found to vary enough by race for differences to be statistically significant. It is conceivable that statistically significant differences would be identified in larger samples. If the differences by race were accepted as significant, the estimate of impact would be largest for Hispanics, with the estimate for blacks following.

The effect of characteristics (age, age squared, and location of residence were included in the equation, as noted) on income change did vary significantly by race. When these interactions are taken into account, the estimated effect of training drops to $1400 and the significance level rises above the standard .05 level (p=.09).

As a matter of interest, an estimate of the training effect calculated using the deviation-from-trend (CBO) method does give a higher figure than any obtained using the income change method. To make this calculation, negative projected post-program income figures were converted to zero before deviations from trend were calculated. Deviations were regressed against the training status variable and a set of individual characteristics. The resulting estimate of the training effect for men is $4200 over a year period.

Since the earnings functions of participant and comparison group members differed for black women, it was decided not to accept any estimates of earnings impact for them. This does not mean that training had no effect on earnings for this category; it simply means that the comparison group is too different to allow for estimating what that effect is.

For white women effects of training are positive, but not statistically significant. Actually, in the pre-program period there is a nonsignificant negative value (-$428; p=.16) attached to the training status variable, while in the the post-program period there is a nonsignificant positive effect ($583; p=.39). Accepting these values as significant and following the NCEP suggestion to take the change from pre- to post-program periods as the measure of impact, the estimate would be that training was worth approximately $1,000 in 1985 for white women. This appears to be a rather hazardous guess, since the significance level of the post-program estimate, in particular, is high. But a similar estimate is obtained if 1980 is used as the base year. In that case, the pre-program value of membership in the training group is $22 (p=.98) and the post-program value is $1100 (p=.09). Thus, while the values shift, the net estimate remains virtually the same.

A separate estimate will not be presented for Hispanic women because of limited numbers, but the estimated income equation appears to be essentially the same as for white women.

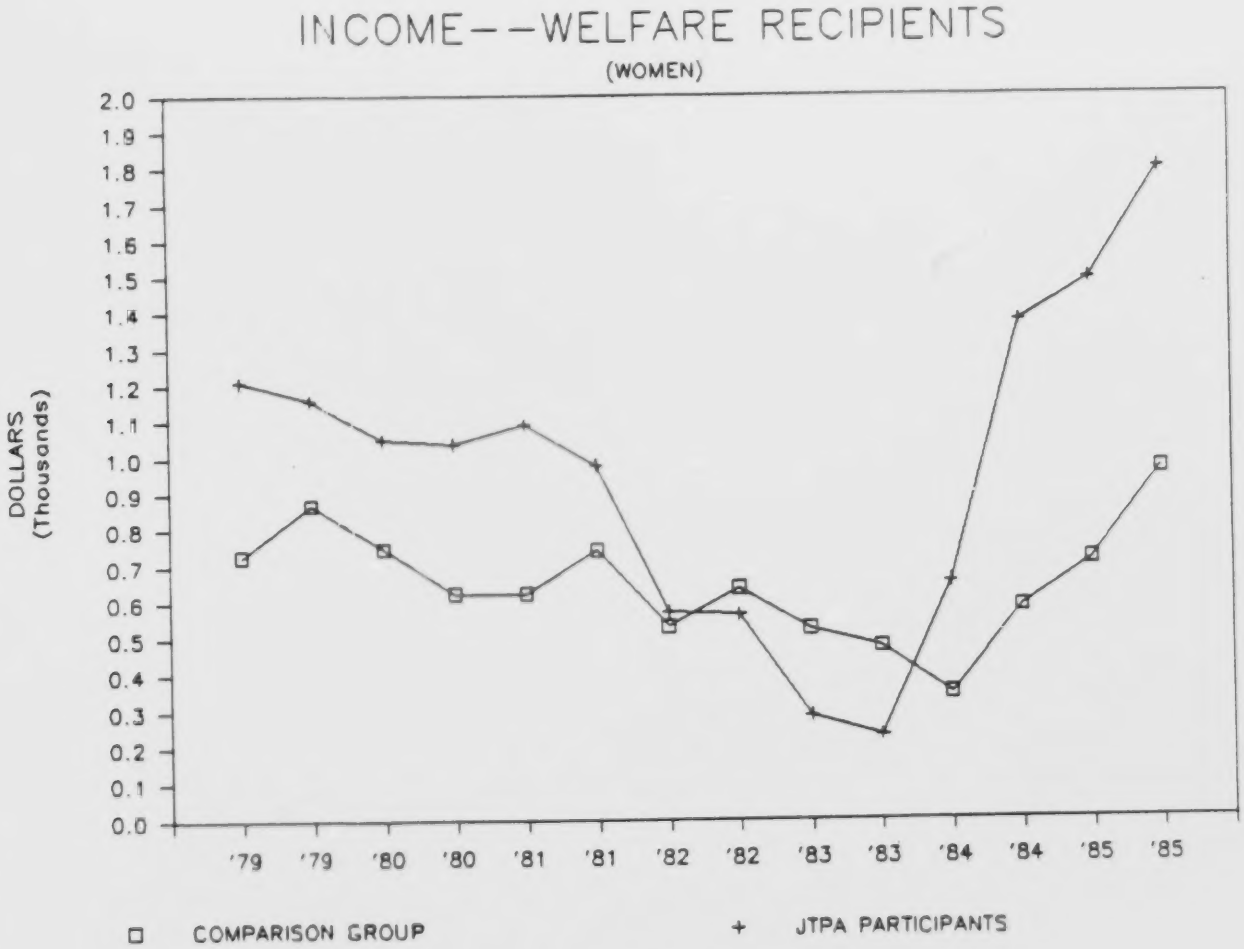
For white women, too, an estimate was made using the deviation-from-trend method to provide a comparison. The effect of training using this method is $1800 over a year's time. This result is significant at the .05 level.

The findings presented here differ somewhat from those reported from studies of CETA. In general, studies of CETA found an insignificant or negative effect for men and a fairly large, positive effect for women. Because of the limitations of existing methods, it is not possible to say that the findings here demonstrate that the effect of JTPA is different than that of CETA. However, it has been speculated that stipends offered under CETA attracted male participants who were more interested in the subsidy than in the training and that this resulted in the finding of small or negative effects from participation. Some evidence has been reported that men participating in CETA who did not receive stipends <u>did</u> demonstrate earnings gains after training. Whether JTPA provides more effective training for men than CETA did is certainly a question of substantial interest. It is hoped that future research can provide a more definite answer.

ESTIMATES OF THE EFFECT OF TRAINING PROVIDED TO AFDC RECIPIENTS

Income Increases

Whether JTPA training increases the income of AFDC recipients is a question of special interest, since one would like to know if JTPA helps those who have the greatest need. The following table displays the income patterns over time for JTPA participants and comparison group members who were receiving AFDC payments at time of application. As with participants as a whole, there is a pre-program dip in earnings that is more prominent for JTPA participants than for the comparison group.



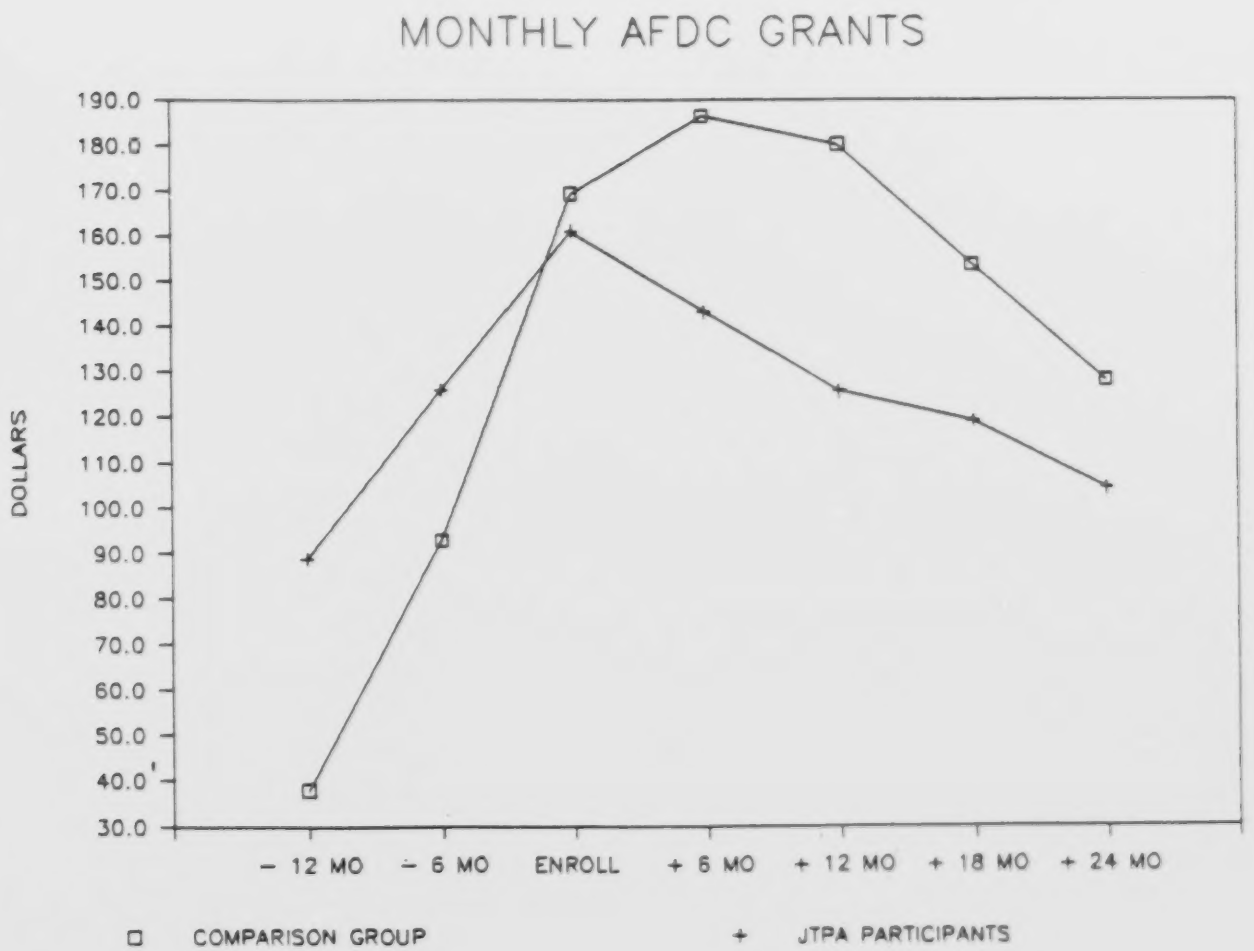
Estimates for the impact of training provided to women receiving AFDC payments were made using the income change method used for all participants. Data for white women and black women were pooled to have the greatest number of cases to analyze. Even then, only around 200 cases were available for the analysis.

As hoped using income data prior to training (1979 and 1980 data), there is a very small and non-significant association between the training status variable and income change. This indicates the training status variable is not a proxy for important, but unmeasured, differences between participant and comparison groups and allows for a straightforward estimate of the effect of training. This estimated effect is approximately $1,200 in 1985, which means that the change in income attributable to training amounted to over 100% of total 1979 income for participants.

Some caution should be attached to this estimate, though. It is certainly possible that the two groups differed in important ways, but that these differences were not apparent in the pre-training period. It should be noted that almost all of the comparison group were WIN mandatory applicants. This certainly raises the possibility that their internal motivation was lower than that of the AFDC recipients in the JTPA group.

In addition to increase in income, there are other measures of training impact appropriate to AFDC recipients. These are measures that identify reductions in welfare dependency. Achieving such reductions is an explicit goal of JTPA. There are surely psychological benefits realized by those who reduce their dependency on welfare, but the focus of this study is on benefits that are more readily quantified. One such quantifiable measure is reductions in grant levels.

The next table shows, for participant and comparison groups, the pattern of average monthly AFDC payments at six month intervals. Unlike income data, data on monthly payments is tied to each individual's specific enrollment date, rather than to calendar dates. This allows for somewhat more precision in identifying the temporal relationship between participation and outcomes. Unfortunately, it was generally not possible to obtain information for a period more than twelve months prior to enrollment. This means that it is difficult to say with any confidence that the grant level twelve months prior to enrollment is representative of typical pre-enrollment grant levels.



Prior to enrollment, the average grant level for JTPA participants is higher than for the comparison group. At enrollment it is about the same and after enrollment it is lower for JTPA participants. In fact, the average grant level for the comparison group does not peak until six months after enrollment. At that point the level for JTPA participants is already declining. This is more than was expected, because of a rule intended to counteract the disincentive to seek employment. This rule is the "30 and 1/3 rule," which delays for a time grant reductions that result from increases in income.

Again, these are raw figures, unadjusted for differences between the two groups. To make the actual estimates of the effect of training on grant levels, the income change method was used, substituting grant amounts for income. The dependent variable was change in the individual's grant level rather than the individual's grant level itself. No characteristics, including age and age squared, were found to be related to change in grant level. This is not surprising, since the fixed effect of these characteristics should have been removed by the differencing procedure and there is no reason to expect that age would relate to grant amount in the same way it does to income.

With change in grant amount as the dependent variable, a negative effect for the training status variable is desirable--at least after the training period. A negative value (or positive value) before the training period indicates some pre-existing difference between the training and comparison groups.

The evidence on whether such a difference exists is ambiguous. On the one hand, the training status variable is not significantly related to change in grant level between 12 months prior to enrollment and six months

prior. If this is taken to be the basic condition, any estimates of the training effect can be accepted as they are. On the other hand, for the period from six months prior to enrollment up to enrollment, there is a negative value (-$47) associated with membership in the training group. If this bias is taken to be fundamental, then this amount will have to be deducted from any estimate of post-training effect. With that in mind, estimates were generated for each of the post-training intervals and are presented below.

Period After Enrollment

	Six Months	Twelve Months	Eighteen Months	Twenty-four Months
Estimated Training Effect	-$94	-$105	-$86	-$75
Corrected Estimate	-$47	-$58	-$39	-$28

Corrected estimates have had the $47 pre-existing bias subtracted from the original estimated effect. It will be noted that the estimates are substantial for the six-month period and are highest for the twelve-month period, declining thereafter. It would be very useful to have grant levels for a much longer period of time. The overall pattern suggests that high grant levels are a transitory phenomenon for both. Perhaps all that is being examined are temporary divergences between the groups. The fact that a divergence between the two groups appears at the enrollment time raises the question whether training is actually the causal factor in the lowering of grant levels for the JTPA group relative to the comparison group.

Termination of Grants

A second way to measure reductions in welfare dependency is to determine whether the need for grant payments is eliminated entirely. It is possible that all of the reduction in the average grant level was achieved just by a lowering of payments without any recipient's payment ending altogether, but it is more likely that some people earned enough for assistance to be completely eliminated.

Technically speaking, this second measure is a much different kind of measure than has been considered so far. Measures previously used, earned income and grant levels, are continuous. That is, they may vary continuously over an indefinite number of values. This measure is dichotomous; one is either receiving payments or not. Although special statistical techniques have been developed to analyze such variables, simple regression techniques were used. This approach should be adequate given that the proportion of persons who ceased receiving assistance after enrollment ranges from 25% to 50% depending on the time period. It is with extremely low or high proportions that simple regression techniques become unacceptable. The equation used takes the form

$$\text{OFF-AFDC} = a(\text{CHAR}) + b(\text{TRAIN})$$

where OFF-AFDC is given the value of 1 for those who were no longer receiving assistance at a specific time after enrollment--all those included in this analysis were receiving assistance at the time of enrollment--and 0 for those who were still receiving grants; CHAR again stands for various individual characteristics; and TRAIN again is given the value of 1 for those who were in JTPA programs and 0 for those who were not. The small case let-

ters, a and b, stand for the effect of each factor. The value of b is the effect of training expressed as a percentage point increase in the probability of no longer receiving AFDC. Consequently, if the probability of comparison group members leaving AFDC is 30% and the value of b is 15, then the probability of JTPA people leaving AFDC is 45%. This value can also be converted to a proportional increase in probability. Thus, the proportional increase in this example is 50% (15/30).

Estimates were made for all the post-enrollment time periods, six months, twelve months, eighteen months, and twenty-four months. The pattern is rather interesting.

EFFECT OF TRAINING ON THE PROBABILITY OF AFDC GRANTS TERMINATING BY PERIOD AFTER ENROLLMENT

	Six Months	Twelve Months	Eighteen Months	Twenty-four Months
Increase in Probability	16* points	19* points	15* points	11** points
Proportional Change in Probability	94%	86%	47%	25%

*$p \leq .02$
**$p = .11$

The greatest absolute increase in probability comes at twelve months after enrollment, while the greatest proportional increase comes at six months. At the six-month mark, the probability of comparison group members terminating from AFDC is only 17%, so a 16-point increase is very substantial. In the short run at least, the estimated effect is very impressive.

There is a notable drop in the proportional change in probability at the 18-month point. This happens because the probability of comparison group members no longer receiving assistance has increased markedly by then. By the 24-month mark the probability that a person in the comparison group will no longer be receiving assistance has increased to 44%. It appears that a good number of people will terminate from AFDC eventually in any case, though not necessarily for employment related reasons. Clearly this limits the long-term significance of training for reducing AFDC expenditures.

From an economist's point of view, reductions in transfer payments are not a benefit to society as a whole. They are a benefit to non-participants insofar as less tax revenue is required as a result of reduced payments, but they are a cost to participants who are foregoing them in exchange for earned income. Therefore, on balance the social benefit is zero. This issue is considered more extensively in the NCEP guidelines.

CONCLUSION

It is encouraging that all findings are positive. Even though the evidence is sometimes weak--significance levels in some cases are not adequate to inspire great confidence--all of the evidence points to training having a beneficial effect for Hoosiers who enroll in Indiana's JTPA programs.

Only when the results of a classical experiment are available for comparison will it be possible to say if statistical methods used to date have done a good job of providing estimates of training effects. For that reason, some caution must be attached to any estimates made of the effect of training. All estimates must be considered provisional, but if one is going to have provisional estimates, it is good at least to have sizeable positive ones. For men, the estimate of the training effect is an additional $1400 earned in 1985. Unfortunately, it is not possible to say how long the benefit might persist. It surely would persist for some time though. For white women (no estimate was made for black women), the effect is $1000 of additional income in 1985.

The findings are most encouraging in regard to benefits for AFDC recipients. The estimated benefit from training is an extra $1200 of income for 1985. In addition there is a prediction of a $105 reduction in the recipient's monthly grant amount 12 months after enrollment and lesser reductions are predicted for other time intervals. Some of this reduction results from people being terminated completely from AFDC.

In short, until more definitive evidence is available, it is reasonable to accept the proposition that JTPA training does make a difference.